Application No.: 10/602,724

REMARKS

The indication of allowable subject matter in claims 2-5 is acknowledged and appreciated. In view of the following remarks, it is respectfully submitted that all claims are in condition for allowance.

Claims 7-31 had previously been canceled at the time of filing the present application as indicated by the checked item 6 of the filed Request Form For Application Under 37 CFR 1.53(b), thereby rendering the double-patenting rejection moot.

Claims 1 and 6 stand rejected under 35 U.S.C. § 103 as being unpatentable over Matsuo et al. '716 ("Matsuo") in view of Park '906 ("Park"). This rejection is respectfully traversed for the following reasons.

Claim 1 recites in pertinent part, "the gate insulating film comprising: a high dielectric constant film containing a ***metal, oxygen and silicon***; and a lower barrier film formed below the high dielectric constant film and containing the metal, oxygen, silicon and nitrogen" (emphasis added). The Examiner relies on TiSiON layer 82 of Matsuo as the claimed lower barrier film (the Examiner inadvertently refers to element 92 in Figure 9 of Matsuo, but it appears the Examiner intended to refer to element 82 as no element 92 exists in Figure 9). The Examiner admits that Matsuo "fail to disclose the required high dielectric constant layer on top of" the alleged lower barrier film 82 and therefore relies on Park as allegedly disclosing a ***$HfSiO_4$*** high dielectric constant film 13, thereby modifying Matsuo to include the alleged high dielectric constant film 13 of Park.

However, contrary to the Examiner's assertion, element 13 of Park which is formed on top of gate insulating film 12 is NOT specified as $HfSiO_4$. Rather, Park expressly discloses that element 13 is a barrier layer specifically specified as ***TiAlN*** (*see, e.g.*, paragraph [0016] of Park). Accordingly, even assuming *arguendo* proper, the proposed combination would result in a ***TiAlN***

(Park)/TiSiON (Matsuo) layer; whereas the claimed high dielectric constant film of the present invention contains a "metal, ***oxygen and silicon***" (emphasis added). That is, the alleged high dielectric constant film TiAlN of the proposed combination does not contain oxygen nor silicon.

The Examiner is directed to MPEP § 2143.03 under the section entitled "All Claim Limitations Must Be Taught or Suggested", which sets forth the applicable standard:

> To establish *prima facie* obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. (citing *In re Royka*, 180 USPQ 580 (CCPA 1974)).

In the instant case, the pending rejection does not "establish *prima facie* obviousness of [the] claimed invention" as recited in claim 1 because the proposed combination fails the "all the claim limitations" standard required under § 103.

Under Federal Circuit guidelines, a dependent claim is nonobvious if the independent claim upon which it depends is allowable because all the limitations of the independent claim are contained in the dependent claims, *Hartness International Inc. v. Simplimatic Engineering Co.*, 819 F.2d at 1100, 1108 (Fed. Cir. 1987). Accordingly, as claim 1 is patentable for the reasons set forth above, it is respectfully submitted that all claims dependent thereon are also patentable. In addition, it is respectfully submitted that the dependent claims are patentable based on their own merits by adding novel and non-obvious features to the combination.

For example, new claim 35 recites in pertinent part, "wherein the lower barrier film is amorphous" (*see, e.g.*, page 12, lines 17-18 of Applicant's specification). In contrast, the alleged lower barrier film 82 of Matsuo consists mainly of TiO_2 crystal grains 83 so that the TiSiON film as a whole is not amorphous. On the other hand, according to the present invention as embodied by claim 35, due to the amorphous lower barrier film a reaction between the high dielectric constant film and the substrate can be prevented (*see, e.g.*, page 2, lines 21-23 of Applicant's specification).

As the high dielectric constant film can remain mostly amorphous, occurrence of leak current can be suppressed in the gate insulating film. As a result, the thermal stability of the gate insulating film can be improved, and a semiconductor device having excellent heat resistance can be realized (*see, e.g.*, page 2, lines 15-19 of Applicant's specification).

Similarly, claims 32-34 are patentable based on their own merits and are supported on page 12, lines 5-7; page 12, lines 13; and page 12, lines 3-5 of Applicant's specification; respectively.

Based on the foregoing, it is respectfully submitted that all pending claims are patentable over the cited prior art. Accordingly, it is respectfully requested that the rejection under 35 U.S.C. § 103 be withdrawn.

CONCLUSION

Having fully responded to all matters raised in the Office Action, Applicant submits that all claims are in condition for allowance, an indication for which is respectfully solicited. If there are any outstanding issues that might be resolved by an interview or an Examiner's amendment, the Examiner is requested to call Applicant's attorney at the telephone number shown below.

To the extent necessary, a petition for an extension of time under 37 C.F.R. 1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account 500417 and please credit any excess fees to such deposit account.

Respectfully submitted,
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